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GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

New Fellows of the Society; Monthly Meeting of February. A regular monthly meeting of the Society was held at the Engineering Societies' Building, No. 29 West Thirty-ninth Street, on Tuesday evening, February 29, 1916. President Greenough presented by name the following fifteen persons, recommended by the Council for election as Fellows, and after a vote they were declared elected:

E. C. Andrews
J. P. Ault
Henry A. Christian
William W. Clendenin
Countess Eila Festetics
William M. Gregory
John W. Harshberger

George A. Mulloy
Howard Notman
Charles W. Obermaier
John M. Phillips
George Shiras, 3rd
Howard E. Simpson
J. W. Stromberg

Thomas M. Weed

Dr. Frederic Poole then addressed the Society on "China, Ancient and Modern."

At an extra inter-monthly meeting on January 11 Mr. Frederick I. Monsen, F.R.G.S., spoke on "Turbulent Mexico."

NORTH AMERICA

The Growth of Connecticut as a Manufacturing State. The industrial character of Connecticut appears from the figures in the U. S. Census Report on Manufactures for 1900-1905. The state accounted for 80.7 per cent of the rolled brass and copper, 72.2 per cent of the ammunition, 69.4 per cent of the clocks, 66.9 per cent of the plated ware, 51.6 per cent of the brass ware, and 46.9 per cent of the hardware produced in the entire country. Germs of this development existed in 1818—a date for which reliable information is attainable—and indeed earlier, for industrial change was gradual. The Revolution had wrought no startling metamorphosis ("An Introduction to the History of Connecticut as a Manufacturing State," by Grace P. Fuller, *Smith College Studies in History*, Vol. I, No. 1, 1915). The state still imported little raw material, and its exports were still confined to extractive products from the limits of the tidewater area. The five incorporated towns owed a large share of their prominence to commerce, a fact particularly true of New Haven, with its considerable foreign commerce, and New Bedford in the heyday of its whaling industry. This period of the early nineteenth century marked the first stage of emergence from the old-time handicraft manufacturing. The back-country towns indeed continued dependent on their own industry for all kinds of manufactured goods. Contemporary records list 38 such rural towns—about half the actual number—as having only the slightest contact with the outside world. Towns with a genuine outside market numbered 45. In these, business was for the most part conducted on the social-order method excepting only in the two capitalized industries of straw-braiding and shoe-making, where domestic work predominated. At this epoch the state was supporting a maximum population for its agricultural resources, and the major part of its increase emigrated westwards.

In 1845—another date for which satisfactory evidence is forthcoming—the state was still primarily agricultural. Sixty per cent of the population lived in distinctly agricultural towns (i. e. townships) of under 3,000, and many of the dwellers in the manufacturing towns were dependent on agriculture for a livelihood. But the manufacturing possibilities of the state were now more apparent. Although the supply of raw material was poor, means of communication were good for the time. Already by 1845 the east-to-west waterway of Long Island Sound was connected with the Western (Boston and Albany) Railroad by three cross-country lines. Water-power resources were exceptional, and labor, though limited in quantity, was of superior quality. Scarcity of the latter played a significant part in deciding the particular form of manufacturing evolution. Unlike the English development, manufacturing in New England passed directly from the handicraft stage to the factory without the intermediate domestic system. The agricultural expansion of the West created a new attitude towards labor in the East, bestowing on it value and dignity. The mid-century period also pointed out the destined specialization of Connecticut manufacturing. Notable early industries disappeared—the iron manufacture of Litchfield, the flour-milling of the southwest shore,

the distilling of the agricultural section above Hartford. Textiles made little progress, but light metal wares increased. The manufacture exemplified by "Yankee" notions, clocks, and tinware, formerly peddled industriously—almost notoriously—by Connecticut sons in the South, was soon to enter on the grand stage of production and to make the state primarily manufacturing. The change may be said to have been reached between 1870 and 1880. In 1870 the population was almost twice that of 1820, when agriculture was supporting the maximum density for the time, and in 1880 more than half the people had come to live under urban conditions.

Lundbreck, Alberta: A Mining Venture. Lundbreck is a foothills village west of Lethbridge, Alberta. Much of the originally forested Crows Nest Valley, in which the village is located, has been repeatedly burnt over and the forest replaced by prairie,—excellent grazing land and favored moreover by the climatic advantage of well-developed chinook winds in winter. The withdrawal of the native Indians to reservations in the early eighties cleared the way for a large-scale grazing industry. Great ranges existed until the appearance of the railroad and the homesteader in 1897. Six years later a station was established on the site of Lundbreck. Thus was afforded facility for shipping the coal known to occur at that point. Two mining companies commenced operations; a



FIG. 1—The coal-mining "boom" town of Lundbreck, Alberta, in its present decline. (Photo from Canadian Geological Survey.)

combination of their names furnished the designation for the town that rapidly sprang into existence. Steady progress was made until 1907, when work at the mines became spasmodic. During the summer the place was practically deserted: in the fall of 1908 one company, employing some fifty men, was shipping its coal to Spokane, the other remained closed for the greater part of the year. The decline continued until 1911, when there was a revival of business—the daily output increased from 30 to 450 tons, 150 men were employed, and the town population rose to 300. These non-union mines had been able to profit by a general strike of the West Canadian coal fields; but the boom was necessarily short-lived, and a decline set in once more. In 1914 coal was extracted for local consumption only. The miners—chiefly English, Scotch, Welsh, and Nova Scotians—nomadic like all their kin in the regions of the prospector, dispersed to other fields, except a few who took up homesteads in the vicinity. These with the earlier settlers constitute the support of the present village of some fifty souls. Causes of the decline are to be found in difficulties inherent in the resource itself, in the lack of a home market and competition with more favored areas, and in correlated mismanagement of the mining operations. The seams are intensely folded, broken by small faults and inclined to "pinch out." The mines need careful timbering, and timber is only to be procured at a distance. West of the Lundbreck area are the highly bituminous or anthracitic Kootenay coals: east is the great field of the Belly River formation.

Under such conditions it is not surprising that Lundbreck showed the evanescent features more characteristic of the mining of the precious metals. (Compare with the item below on "The Rise and Fall of the City of Gladstone.") JAMES S. STEWART.

The Rise and Fall of the City of Gladstone. Under this title the ephemeral life of a type of western city is described by C. C. Baker in the 1914 issue of the *Annual Publications of the Historical Society of Southern California* (Vol. 9, Part 3, pp. 188-194). The adventurous spirit which leads settlers into sparsely populated districts between the Rockies and the Pacific does not stop at creating cities whenever there appears to be opportunity for making boom sales of house lots. Gladstone owes its spectacular career to the great boom which swept over California in 1887. Its promoters saw in the town a future rival to Los Angeles.

But a city is a natural product. The causes of its existence are generally economic. As a rule it is a station on an avenue of trade. Its prosperity also depends on the natural resources of the enviroing country. Gladstone could not boast of special advantages in this respect. It was an unnecessary artificial creation—a venture launched, it may be suspected, for purposes of speculation rather than with other aims. Many mining settlements of the Gladstone type had a similar fate. Abandoned shanties mark their site in the deserts of California and Nevada, in the mountains of northern Idaho, and along the deep valleys of the Interior Plateau of British Columbia. (See also the preceding item on Lundbreck, Alberta.)

Another excellent example of the "ghost" cities of the West is described in an article that appeared under this title in the *Saturday Evening Post* (Philadelphia, Sept. 4, 1915). Before the great slump in the price of silver following demonetization, Eureka, Nevada, boasted a population little short—it is said—of five figures. According to the last Federal census the population of the precinct was only 661.

Winter Steamship Connection between Prince Edward Island and the Mainland. The old limits to the navigation of shores ice-bound in winter are being slowly pushed back. The success of the large British ice-breakers in extending the Archangel shipping season has attracted much attention. Now from Prince Edward Island comes the report that for the first time in the history of the island communication with the mainland has continued daily without interruption throughout the winter (*Commerce Reports*, March 13, 1916). This success has been achieved by the new car-ferry steamer acquired for the Charlottetown-Pictou (N. S.) service. Heretofore the heavy ice of Northumberland Strait has always constituted an impediment, whose effect showed itself in the diminished returns for freight and passenger traffic during the winter. During the months of January and February of the current year shipments to the United States were valued at \$47,640, whereas for the corresponding period of the preceding year, with broken communications, they were only \$16,329.

Distribution of Thunderstorms in the United States. The geographic distribution of thunderstorms is a matter of great meteorological and climatological interest—meteorological, because of the need of this information in our study of the origin and mechanics of these phenomena; climatological, because of the many relations which exist between thunderstorms and the life of man. Our crops, our safety, our water supply, our outdoor activities, are all measurably affected by thunderstorms and by their accompanying lightning and hail. Charts of thunderstorm distribution have been published in Professor Alfred J. Henry's "Loss of Life in the United States by Lightning" (*U. S. Weather Bur. Bull. No. 30*, 1901) and in the same writer's "Climatology of the United States" (*Bull. Q.*, 1906). There has always, and naturally, been some difficulty in defining "a thunderstorm" for purposes of record and of charting. Thunderstorms vary in intensity from those of great violence, with well-defined characteristics, to those which amount to no more than a peal or two of thunder, perhaps without any precipitation. The official instructions for the observation of thunderstorms have varied from time to time during the period of our Government meteorological service, and this fact, together with the inevitable difficulty of accurate and specific observation, have made our records rather unsatisfactory.

What are likely, for some time to come, to be the standard charts of thunderstorm distribution for the United States have been prepared by Mr. W. H. Alexander and published in a recent number of the *Monthly Weather Review* (Vol. 43, 1915, No. 7). The period covered is 1904 to 1913, inclusive, during which time the systematic observation of thunderstorms, according to a uniform scheme, has been on a more satisfactory basis than in earlier years. Mr. Alexander has charted the total numbers of thunderstorms for each month and for the year during the ten-year period above noted. By dividing the numbers shown on the charts by 10 the average annual number is easily determined.

The chart of most general interest is that of the annual frequency. No part of the United States is entirely free of thunderstorms. There are two centers of greatest activity, one in Florida and the other in northern New Mexico. Around Tampa, Fla., 944 thunderstorms have been recorded in the ten years, and in the vicinity of Santa Fé, N. Mex., the number is 710. Our previous charts showed the center of maximum frequency over Florida, but did not indicate any marked second center over New Mexico. The new chart, further, does not bring out a center of considerable thunderstorm frequency over the lower Missouri valley, as did the earlier charts, although the general bending of the lines of equal annual 10-year numbers on Mr. Alexander's chart, northward and northwestward up the Mississippi and Missouri valleys, emphasizes the favorable conditions of thunderstorm occurrence over that region. R. DEC. WARD.

A New Isogonic Chart of the United States. *Special Publication No. 33* of the U. S. Coast and Geodetic Survey contains a map showing lines of equal magnetic declination and of equal annual change in the United States for 1915. This map is a revised edition of the isogonic chart published in 1910 in *Special Publication No. 9*. Since that time the results of observations at more than one thousand new stations and two hundred repeat stations in the United States and adjacent parts of Canada have become available. These data are being collected in the course of operations undertaken since 1899 with the object of making a magnetic survey of the United States.

The map shows that the line of no change of declination runs from the Lake of the Woods through St. Paul, Minn., Springfield, Ill., to Key West, Fla. For places east of this line the north end of the compass needle is moving to the westward, and to the eastward for places west of that line, at annual rates indicated on the map. The agonic line, or line of no declination, for 1915 lies somewhat to the east and passes through the lower end of Lake Michigan, western Ohio, and southwestern South Carolina, leaving the land at Beaufort and continuing through Nassau in the Bahamas and the eastern tip of Cuba. The disturbing influence of the Appalachians is evident from the irregularity of the line in that region.

The Northern Hardwood Forest of Eastern North America. The northern hardwood forest, occupying approximately 50,000,000 acres mainly in the basin of the Great Lakes and the St. Lawrence, with a southern offshoot on the Appalachians, centers around the area of maximum exploitation of the white pine. Its limits are almost exactly defined by the range of the yellow birch, with the sugar maple the most characteristic hardwood tree. The northern is further distinguished from the southern hardwood forest by the presence of spruce and hemlock, the absence of yellow poplar, red gum, and sycamore, and also by relative simplicity of composition. It has only 21 hardwood species against the 95 of the southern. The broad limits of the forest are determined to the west by the factor of decreasing rainfall; to the north and south by temperature. Within the region the optimum temperatures—a value more important than extremes—are to be found at elevations varying with the latitude from 500 feet (minimum) above sea level in northern New England to 3,500 feet (minimum) in South Carolina. Soil selection is seen most clearly in the Great Lakes region, where glacial clays are particularly favorable. Yet lighter, sandy soils are not avoided where there is exposure to moist winds, as in the southwestern corner of Michigan. On dry, sandy plains the type runs to one extreme—oak, hickory, and chestnut. The other extreme, the swamp lands with black ash, red and silver maple, and willow, is more distinctly southern and might be considered as an outlier of the southern type ("The Northern Hardwood Forest: Its Composition, Growth, and Management" by E. H. Frothingham, *U. S. Dept. of Agric. Bull. No. 285*, 1915). The forest has been one of the factors of profound importance in the progress of North American civilization. First barrier, then resource, something of the magnitude of its influence may be gleaned by simply noting the extent of forest removed. Originally the forest cover stretched practically unbroken from Maine to eastern Minnesota: now, including second growth, the forested surface is reduced to 60 per cent in New England, 43 per cent in Michigan and Wisconsin, and 35 per cent in New York and Pennsylvania. The greatest reduction has, of course, been in the soft woods. They were the exploiter's magnet. The hardwoods were principally removed for agricultural clearings, until the decline in softwood production gave them an increasingly important market. Since 1899 the cut of hardwood has also declined, though not so rapidly as that of the softwoods. Figures for 1912 show a relative increase in the proportion of the former of 28 per cent for Michigan, 24 per cent for Vermont, and 22 per cent for New York. Small increases are indicative of states where conifers still remain comparatively important—spruce in Maine, white pine in Minnesota, and hemlock in Pennsylvania.

The Danish West Indies. Location is a geographic factor of prime importance in the case of two of the West Indian islands, Curaçao and St. Thomas. As a refuge and revolutionary base Curaçao has figured in Venezuelan politics from the outbreak of the Wars of Independence. Political interest in St. Thomas, more spasmodic, is again to the fore with the revival of the half-century old project of the purchase of the Danish West Indies by the United States. The largest island of the group, Santa Cruz (St. Croix), is fertile and well adapted for its old business of sugar cultivation and its new one of cotton growing; but this is a matter of little weight beside St. Thomas' superb harbor and situation as the "Gibraltar of the American Mediterranean." Always a free port, open to the shipping of all nations, Charlotte Amalia has enjoyed its periods of prosperity. In the eighteenth century this neutral port gained its reputation as a collecting and distributing center for the islands. In the American Civil War it proved, like Nassau in the Bahamas, one of the most accessible West Indian ports for the blockade runners of the Confederacy. Decline came with the replacement of sail shipping by steam. Economic decline has been followed by decrease in population, to which the high infant mortality due to bad sanitation—said to be no less than 63.5 per cent (*The Independent*, March 6, 1916)—is a contributory and correlated cause. For the three islands of the group the population in round numbers was 43,000 in 1835, 30,000 in 1901, and 24,000 in 1914. The Danish West Indies thus present an absolute contrast to Porto Rico, where improved economic and hygienic conditions were followed by a rapid expansion of population (cf. the article on "Overcrowded Porto Rico" in the *March Review*, pp. 211-212). The measure of importance still retained by St. Thomas is due to its advantages as a coaling station (*Diplomatic and Consular Repts.*, Ann. Series, No. 5485, London, 1915). On the work incident to this depends the greater part of its 10,000 inhabitants, negroes from the British West Indian islands.

The West Indian Hurricane of August, 1915. Our records of West Indian hurricanes go back as far as the time of Columbus (1493). In all, nearly five hundred of these storms have now found their place in this long history. The origin of tropical cyclones is still open to debate. But their prognostics, characteristics, usual belts, and destructiveness are well known. Although all more or less alike, a careful study shows that each hurricane has individuality. Each one is therefore worth accurate charting and close scrutiny. The Gulf hurricane of August last, whose current history was fully reported in the daily papers, has been studied by Professor H. C. Frankenfield of the U. S. Weather Bureau (*Monthly Weather Rev.*, 1915, pp. 405-412). The storm center seems to have reached the west of Texas, near San Luis Pass, about 26 miles southwest of Galveston, about 1 A. M., August 17, shortly after which time a slow recurve to the north and northeast began. The lowest barometer reading at Galveston was 28.63 inches, with a maximum wind velocity of 93 miles an hour. At Velasco, Tex., the barometer fell to 28.06 inches, the lowest recorded during this storm. This is, of course, not by any means unprecedented. The diameter of the "eye" was about five miles. The loss of crops, buildings, railroads, shipping, and live stock was estimated at close to \$50,000,000. Crops in fully one-half of Texas suffered severely. Damage by high winds was reported as far as the lower Ohio valley, especially over eastern Missouri. The greatest damage was, however, due to the floods resulting from the torrential rains which extended from Texas northeastward to New York. At Galveston, the famous "sea wall" (17 feet above mean low tide) which was built after the "Galveston storm" of September, 1900, to protect the city from flood damage caused by the Gulf waters, stood firmly and doubtless served effectively to prevent far more serious losses of life and property than actually occurred. Comparing the 1915 hurricane with that of 1900 it appears that the two storm paths were very similar. The wind velocities in these storms were not very different, and the effects were much the same, except as modified by artificial conditions in the vicinity of Galveston. Several illustrations of the damage done at Galveston and Houston and a number of special weather maps accompany Professor Frankenfield's paper.

R. DEC. WARD.

SOUTH AMERICA

Fur Industry of South America. Chinchilla, nutria, jaguar, and puma are usually cited as the chief South American furs of commerce. To these may be added vicuña, fox, and seal. With the exception of jaguar and puma the fur-bearing animals of the land are limited to the highlands of Peru and Bolivia and the parts of Chile cool or temperate on account of their latitude or elevation. Trade in the furs of the cat tribe is exceedingly limited. Natives of the Chaco (Paraguay) are described as bartering these skins on the banks of the Paraguay River. In commerce the furs are likely to be known as "South American lion."

Chinchilla is the distinctive and valuable South American fur. It was first introduced on the European market in the early nineteenth century and has lately gained in popularity to such an extent as to seriously threaten exhaustion of supply; prices have become correspondingly elevated. In 1901, Chile exported 385,740 skins valued at \$805,391; in 1910, 50,000 valued at \$1,000,000; in 1911, 37,000 valued at \$750,000 (Chilean currency). The animal is hunted in the Bolivian and North Chilean Cordillera. From the provinces of Antofagasta and Arica, where it was formerly plentiful, it has totally disappeared; Vallenar and the north of Coquimbo are now the chief Chilean producing districts, and here it is reported that skins of a type valued at \$10 in 1908 fetched \$20 in 1910 and \$30 in 1912. In some of the wilder and more inaccessible parts of Bolivia the chinchilla still exists in some numbers. The animal is hunted by the Indians, who commonly employ for the purpose dogs or ferrets which are trained to enter the burrows. The method entails destruction of the young but is a little less barbarous than the use of the dynamite or fire methods that also obtain. A *chinchillero* is endowed with unlimited patience; he will spend two, three or more months in securing as many specimens; however, some of the Bolivian hunters have made fortunes of £8,000 (P. Walle, Bolivia, pp. 370-371, Fisher Unwin, London, 1914).

During the last few years there has been a considerable agitation in Chile for chinchilla conservation. Its advocates urge prohibition for a short term of years, until this fecund animal shall have replenished the supply, and the adoption of such protective measures as a closed season during the breeding time and the exclusive use of proper traps for hunting (see Carlos Sage: "El exterminio de la chinchilla," *Bol. de Bosques, Pesca i Casa*, July, 1912, p. 27, Santiago de Chile. This periodical, which dealt chiefly with the conservation of the resources named in the title was published from 1912 to 1914, when it was suppressed by the Chilean government.) The sovereign method of conservation, however, is breeding. Some attempt at this has been made in Vallenar. On the farm of Sir John Murray the original stock of 500 chinchillas rapidly increased to 2,000 (see illustration in article by Isaiah Bowman, "Results of an Expedition to the Central Andes," *Bull. Amer. Geogr. Soc.*, Vol. 46, 1914, p. 169). In captivity the chinchilla is a little smaller, but the fur is compensatingly fine and thick.

The chinchilla has been crossed with a member of the same family, the vizcacha, producing a fur which, though less valuable, has found a ready market as a substitute for the declining supply of chinchilla. Viscacha itself is exported. In 1900 the trade was unknown; in 1911, over 250,000 skins valued at \$17,667 were sent from Chile.

Formerly the great annual fairs of the Bolivian tableland were the collecting ground for the furs: but their importance has declined of late. Challapata, on the Oruro-Antofagasta railroad, 70 miles from the former city, had the best known fair and is said still to be the best place for buying chinchilla. Export, chiefly to Europe, is made through the ports of northern Chile from Coquimbo to Arica. Coquimbo and Antofagasta are the two principal ports of shipment. In 1913 chinchilla skins to the value of \$14,034 (American) were sent to the United States from the consular district of Valparaiso (including Coquimbo), but no figures are given for 1914. In the latter year Iquique dispatched \$3,893 worth to the same destination (*Suppl. to Commerce Repts.*, Ann. Series, No. 41a, 1915, Washington).

Of the members of the "South American sheep" family—llama, alpaca, guanaco, vicuña—only the last has value as an export skin. Guanaco skins are largely used by the Patagonian natives; llama and alpaca are valued for their wools. The natives have engaged in communal hunts from time immemorial; these are described in much of the South American travel literature. A short article by Charles W. Furlong entitled "Hunting the Guanaco" appeared in the *Outing Magazine* for October, 1912. Today on the European market vicuña skins, used as rugs, fetch £4 or £5 apiece.

The nutria (*coypu*), similar to the American musk rat, is hunted along the water-courses of southern Chile. With otter and fox it is chiefly exported from the center and port of the South Chilean fur trade, Punta Arenas. The "Censo Jeneral del Territorio de Magallanes," Punta Arenas, 1908, gives some export statistics. Prohibitions of seal hunting in northern waters have turned attention to the inferior seals of the southern seas. Seals are common along the Peruvian-Chilean and Argentine coasts, but the better species is found south of 46° S. Such skins conserved in slat are exported to England at the mean price of £5 each. The principal Chilean company, Compañía Austral de Pesquería, has its headquarters in Punta Arenas. Conservation is being urged for the seal as well as the chinchilla. In 1901, 3,306 fine seal skins valued at \$35,899 (Chilean) were exported from Chile; in 1911, 2,612 valued at \$67,912. Other statistics are given in "Estadística Comercial de la República de Chile," Santiago de Chile, 1914. Uruguay also has interests in seal fishing. (See also article "Furs in the Americas," *Bull. Pan American Union*, Vol. 28, No. 2, February, 1914.)

Argentine Labor and the War. It is many years since Alberdi said "to govern is to people," and yet today Argentina has a population of under seven to the square mile. The Government, it is true, encourages immigration and by new colonization laws framed on the homestead plan is endeavoring to fix the immigrant to the soil. At present fully 25 per cent of the total immigration is of the *golondrina* type, upon which the country depends very largely for its harvesting. It has been estimated that at the end of the season the average harvester is able to return to his home in southern Europe with \$150 in his pocket. This source of labor has been hard hit by the war (*The South American Journal*, Dec. 18, 1915). Only 26,800 immigrants had arrived by the end of October, 1915, and 96,000 persons, including 34,000 reservists and volunteers, had left the country. To lighten the harvesting difficulty the railroad companies have been requested to reduce their charges for transportation of labor destined for the purpose.

The Argentine Meteorological Service. The Argentine Meteorological Service was established in 1872, under the direction of Dr. B. A. Gould, the founder of the Astronomical Observatory at Córdoba. Doctor Gould continued in charge of the Service until towards the end of 1884, when he left Argentina. He had established 52 meteorological stations; had secured the publication of four volumes containing discussions of the observations; had constructed isothermal charts whose essentials have not been greatly altered by any later work; and had collected rainfall data which, for the first time, showed the distribution of precipitation over the southern portion of South America. In 1885, Mr. Walter G. Davis, a native of Vermont, succeeded Doctor Gould and continued at the head of the Service until his retirement last year, after thirty years of active work in that position. Under Mr. Davis' able direction, the Argentine Meteorological Service attained a position in the very front rank of all the government meteorological services of the world. The publications have been numerous, and all of them of recognized high standard. Among the many activities of this Service may be mentioned the taking over, in 1904, of the meteorological and magnetic station at Laurie Island, in the South Orkneys, which had been established in the previous year by the Scottish Antarctic Expedition. Under conditions of extreme loneliness and of great hardship, the observers at this remote outpost have maintained their records faithfully for eleven years—a series of observations of the greatest importance in the study of world meteorology. (See the note on the "Climate of the South Orkneys," under "Polar," below.)

With the Laurie Island station (lat. 60°43' S.), the Argentine Meteorological Service extends over nearly 40° of latitude. It has 42 first class, 162 second class, 12 third class, and 1,930 fourth class stations. The 8 A. M. and 8 P. M. observations from 190 stations are used in constructing the daily weather map, besides the rainfall record from about 1,350 rainfall stations.

A recent publication of the Argentine Meteorological Service (1914) gives, in Spanish and in English, the history and organization of the Service, and includes a concise and useful summary of the results, by climatic provinces; a discussion of the atmospheric circulation and the weather of Argentina, by H. H. Clayton, now Chief of the Department of Forecasts, formerly at Blue Hill Observatory, and an excellent series of climatic charts, which give all the essentials of Argentine climatology. This publication is an inspiring record of splendid work, well planned, thoroughly organized, and ably carried out. Mr. Davis, the retiring Director, who is now in the United States, has well earned the rest and the relief from the heavy responsibilities which, as head of one of the world's best meteorological services, he has carried for thirty years.

R. DEC. WARD.

ASIA

Reforestation in China. China is awakening to the necessity of protecting her treeless hills and plains. The forest situation in the country is well-nigh hopeless. Since trees have vanished floods have become common. To a population sunk in deepest poverty the only form of fuel available is timber cut within proximity of the home. The climate of the greater part of the country is such that fuel is as necessary for warmth as for cooking. The needed forest products must be imported, and this the Chinaman cannot afford. He is therefore beginning to realize that his neglect of his country's forests accounts largely for his low standard of living and that with an abundant supply of lumber and timber his comfort, health, and earning capacity would be increased.

W. F. Sherfese, Director of Forestry in the Philippine Islands, contributes to the November number of *American Forestry* (Vol. 21, 1915, pp. 1033-1040) an account of

the action undertaken by a number of influential Chinese and by the University of Nanking to carry on extensive work in reforestation. A school of forestry has been added to this institution and a beginning made in actual tree planting on the slopes of Purple Mountain nearby.

There is reason to believe that forest planting on a large scale on the idle lands of China would be highly profitable. Large tracts of excellent land are now lying waste with an overcrowded and desperately poor population in their vicinity. Soil and climate are eminently fitted for the purpose. Labor is abundant and cheap. It can be made efficient by proper instruction. In comparison with situations in which reforestation has been successfully carried out in the United States, the conditions in China are extremely favorable.

Most of the Chinese idle lands belong to the state. A portion of their total area is well adapted to agricultural and fruit-growing purposes. The orchards occasionally met with show that it is possible to make these lands yield satisfactory results. But by far the largest part of unused lands is suited only to the production of fuel and timber. Steps should therefore be taken to encourage the owners of private land to plant profitable trees and get public lands into private ownership for the same purpose. The Chinese government cannot shoulder the financial burden of extensive reforestation. But much can be accomplished by private enterprise. It is the citizen himself who must feel sufficiently interested in the welfare of his country to undertake seed distribution and the establishment of nurseries.

The reforestation undertaken on Purple Mountain affords an excellent example of what can be accomplished by means of a little care and industry. The work was originally undertaken to relieve a famine-stricken community. Many of the destitute members were assigned to the task of building roads around the mountain. The rich land at its base was turned into a crop-yielding area, and the bare slopes were planted with young trees. The assistance thus rendered to countless Chinese who were homeless and destitute had the twofold advantage of meeting their immediate necessities and of providing some of them with a permanent livelihood. Many families now enjoy a comfortable home on the land made productive by tree planting.

Irrigation in India. The contrasts and resemblances in methods and results of irrigation in India and the United States are of peculiar interest at the present time when there is a temporary lull in development. The renewal of activity in our arid West, which must come about in due time, should be accompanied by a better appreciation of some of the lessons taught by Indian experience.

A recent short article in the *Geographical Teacher* (No. 42, Vol. 8, 1915, Part 2, pp. 118-124) points out the dependence of irrigation development in India upon geographic and topographic conditions and shows how from the beginnings of the old primitive wells watering a few acres there has been a growth, in the northern plains, of the net-work of canals and, in the southern plateau, a multiplication of the many reservoirs and small works, each type being adapted to its topography.

The reservoirs—some of great antiquity—are almost innumerable. They consist essentially of earthen tanks formed by building a series of banks around a depression in the ground or by erecting an obstruction to the outlet of a small valley. They vary in size from a few acres to several thousand acres. The more modern higher dams, instead of being of earth, are sometimes built of masonry, but as a rule the construction is of very simple type. When one reservoir is filled with sediment in the course of time, another is constructed either above or below it, and the surface of what was the older reservoir is converted into cultivated fields.

The most picturesque works, however, are the great canals of the northern plain; in magnitude they far exceed many waterways built in other parts of the world. They are in effect artificial rivers which have been constructed, in many cases, to cross the natural watercourses on huge aqueducts. Occasionally they dive under such channels, re-appearing on the opposite side. In building these works, the topography of the country is in general favorable, but many obstacles must be overcome, due to minor irregularities. The silt difficulty is usually present and necessitates the planning of the works in such a manner as to send the excess of silt downstream and to carry a certain proportion of the finer material out upon the land, where it adds to the soil fertility.

F. H. NEWELL.

Recent Progress on the Bagdad Railroad. The construction of the Bagdad Railroad east of the Euphrates has been pushed vigorously since the war began. In February, 1915, the railhead had reached Tel-el-Abiad, a distance of 37 miles east of the river (C. Rabot, *La Géogr.*, Vol. 30, July, 1915, p. 288). A few months later, on July 23, 1915, the line was opened to traffic as far as Ras-el-Ain (*Board of Trade Journ.*, No.

986, Vol. 91, October 21, 1915, p. 205), a distance of approximately 80 miles farther. It is thus shown on the map facing page 288 of this number of the *Review*. Since then the construction has been completed as far as Nesibin, about 65 miles beyond (*Near East*, March 10, 1916, p. 1). On the southeastern end of the line practically no advance has been recorded beyond Samara since the late summer of 1914. This should dispose of the rumor which had been circulated concerning the completion of the line (see note on "Land Route to India" in the March *Review*, p. 221).

Harbor Improvements at Cebu. According to the *Weekly Commercial News* of San Francisco (September 18, 1915) the improvement of the port of Cebu, Philippine Islands, was being rapidly advanced by the Bureau of Public Works. It was estimated that the work would be completed in November. This improvement will make Cebu one of the best equipped ports in the Philippines, with 3,000 feet of concrete sea wall, berths for two steamers drawing 30 feet, a fifty-ton crane, and all approaches asphalt-paved.

AUSTRALASIA AND OCEANIA

Geologic Problems of the Pacific Islands. In an address delivered before the American Association for the Advancement of Science at the San Francisco meeting, 1915 (Problems of the Pacific Islands, *Amer. Journ. of Sci.*, Vol. 41, 1916, pp. 154-186) Professor Reginald A. Daly outlines some of the geologic problems awaiting the scientist in the rich field of the Pacific islands. Two fundamental problems, vulcanism and coral reef formation, are briefly discussed in relation to the author's own theories. In respect of vulcanism Daly says "volcanoes are the surface expressions of great, molten, basaltic wedges locally thrust up into the solid crust. The pulsing life of a volcano is dependent on the size, gas content, and thermal energy of its feeding wedge. Since each wedge is of limited length, width, and height, ultimate extinction of every volcano is to be expected." He adduces supporting data from the preponderatingly basaltic and related lavas in the Hawaiian and other Pacific islands of which the petrography is known at least in part, and from recent work on Kilauea, a magnificent locus for the study of active vulcanism. Accumulating data on the coral island problem emphasizes the inadequacy of the Darwinian subsidence theory. Most seriously the famous theory fails to explain the feature, universal throughout the Pacific and Indian Oceans, of smooth lagoon floors at depths nowhere exceeding 300 feet and averaging 150 to 250 feet, and their entire discordance with the wall-like reefs of coral. Daly's glacial-control theory regards all existing reefs as post-glacial and built up on wave-cut platforms, the development of which would be comparatively rapid when protective coral growth was inhibited by too cool ocean temperatures. The depth of the platforms is in accordance with the hypothetical depth required by the post-glacial raising—180 feet—of the level of the tropical seas, plus the limits of effective wave cutting. Similar platforms are encountered outside the coral areas. From this point of view the Great Barrier Reef of Australia is to be regarded as a coral veneer on the northerly part of the continental shelf. But investigation of the problem is only beginning; quantitative and qualitative studies must be carried out in the determination of such aspects as the age and resisting powers of the volcanic islands; the erosive powers of ocean waves and currents; the degree and nature of reef-protection, involving biological and paleontological study of reef fauna; and the topographical characteristics of reef and platform.

Life on the Islands of the Mid-Pacific. Interesting glimpses of the life of the South Sea islander are presented by Dr. Alfred Goldsborough Mayer in one of a series of articles on Polynesia he has recently been contributing to *The Scientific Monthly* (The Islands of the Mid-Pacific, Feb., 1916, pp. 125-149). In spite of their picturesque appearance, the atolls, low-lying and mournfully flat, ill-watered and rarely exceeding one-eighth of a mile in width, harbor the most backward of mid-Pacific populations. So defective is the water-supply that the liquid is as precious to the atoll-islander as it is to the Arab of the desert. "To obtain it, the natives cut furrows extending diagonally down the stems of cocoanut palms and leading into a cavity cut in the trunk of the tree, within which a few ounces may collect. Failing of the meager supply they resort in time of drought to the mosquito-haunted swamps, which occur here and there in the center of the islet."

On the large masses of continental rocks such as New Caledonia, as well as on the mid-tropical volcano-islands or the elevated limestone reefs, conditions far more favorable to the development of mankind prevail. The highest culture is therefore restricted to these types. In the protection of the shallow channels between the barrier reefs and the shore, the natives derive an abundant supply of fish for sustenance. The morrow is provided for, and ample leisure under balmy climes marks their lot.

The devastating effects of hurricanes which visit the islands once or twice in a generation bring no lesson to the careless inhabitants of the Southern Seas. Although villages and settlements are literally swept clean, no effort to construct hurricane-proof houses has ever been made, according to Doctor Mayer. The vision of life he conveys in these pleasing lines reveals a careless and resigned attitude of adaptation to natural circumstances on the part of the natives.

OCEANS

Search for Doubtful Islands in the Southern Pacific by the "Carnegie." In the course of the *Carnegie's* circumnavigation of the globe between the fiftieth and sixtieth parallels of south latitude, the Pacific section of which she has just completed, having arrived at South Georgia on January 12 from Lyttelton, New Zealand, which was left on December 6, 1915, a search was made for two islands or island groups which had been reported in the first half of the nineteenth century but whose existence seemed doubtful (*Terrestr. Magnet. and Atmosph. Electr.*, March, 1916, pp. 26-27).

The first of these, the Nimrod Islands, were stated to have been seen by Capt. Henry Eilbech in the ship *Nimrod* in 1828 on her passage from Port Jackson to Rio de Janeiro. The group was placed by him in about $56\frac{1}{2}^{\circ}$ S. and $158\frac{1}{2}^{\circ}$ W., having been seen at a considerable distance. Captain Biscoe sought for the group in 1831 on his Antarctic trip, but the search was ineffectual (A. G. Findlay: *Directory of the South Pacific Ocean*, 5th edition, revised to 1900). The *Carnegie* would have passed over the charted position of the islands if the wind had not shifted twelve hours too soon. Because of this her course did not bring her nearer than 40 miles. More definite information was gained as to the existence of the other island, Dougherty Island. Dougherty Island was supposed to have been seen by a whaling vessel, the *James Stewart*, Captain Dougherty, on May 29, 1841. The position was only determined approximately, as $59^{\circ} 20' S.$ and $120^{\circ} 20' W.$ On September 4, 1859, Capt. E. Keates, of the *Louise* of Bristol, on his passage from Melbourne to St. John, New Brunswick, sighted an island in $59^{\circ} 21' S.$ and $119^{\circ} 7' W.$ (Findlay, *op. cit.*). As his observations were good, it has generally been assumed that he saw the same island as Captain Dougherty, and Dougherty Island has therefore been generally charted according to Keates's position. On December 25 the *Carnegie* was in the vicinity of the position given for the island. The commander himself went aloft every half hour. Nothing could be seen from the masthead. From here the island, with its reputed height of 80 feet, should have been visible if anywhere within 30 miles of the vessel. Finally, the *Carnegie* passed within 3 miles of the alleged position without seeing any sign of land. It thus seems highly probable that the island does not exist.

An explanation of the cause of this and similar illusions is offered by an incident which occurred on the *Carnegie's* cruise. One afternoon the cry of 'land ahead' went up, and what appeared to be a bold, dark rock island was seen. The course was immediately shaped to pass near it. What seemed a rocky cliff, capped with snow, became visible. Nearer approach, however, proved that the supposed island was an iceberg, 225 feet high by a quarter of a mile long. The light was reflected from the perpendicular ice-wall in such a way as to give to the berg the appearance of a huge, dark rock. Some such deception may underlie the reports of the existence of an island in these waters. Indeed, Captain Keates passed several icebergs before sighting the alleged island. He reported an iceberg aground on it whose orientation to the prevailing wind, which was in contrast to that of the other icebergs, confirmed him in his belief that what he saw was an island and not an iceberg. However, he emphasizes the dark color of the island, a criterion which the *Carnegie's* experience has shown to be precarious.

In addition there is always the possibility of a mirage. This is attested by another experience on this cruise of the *Carnegie*, when what appeared to be extensive land was distinctly seen in the direction of Banks Peninsula, at a time when the vessel was 190 miles distant from this prominent projection of the South Island of New Zealand. Similarly, Peary's belief in the existence of Crocker Land has been shown to be based on a mirage. The very party that proved this experienced how persistent a phenomenon it is, for, before reaching the reported position of the land, MacMillan and his companion were also deceived by the phantom.

Current belief in the non-existence of the Nimrod group and Dougherty Island is also reflected on the chart of the Southern Pacific Ocean issued by the U. S. Hydrographic Office (No. 824), on which the designation "position doubtful" on the original edition of 1883 has been changed to "existence doubtful" on the latest revised edition, that of 1912; and on the Prince of Monaco's standard *Carte Générale Bathymetrique des*

Océans, on the current, second, edition of which (1914) the islands have disappeared entirely, although they were shown on the first edition (1905).

The search for the Nimrod group and Dougherty Island were only incidents in the cruise of the *Carnegie*. In spite of trying weather conditions, the magnetic declination was observed on an average twice daily during the entire trip. The total run from Lyttelton to South Georgia was 5,440 miles, covered in 40 days. The *Carnegie* has thus completed a little less than half of her circumnavigation of the globe in sub-antarctic waters, the purpose of which it is to amplify the scant data extant on the terrestrial magnetism of these regions.

POLAR

Climate of the South Orkneys. The meteorological and magnetic station established by the Scottish Antarctic Expedition, under Dr. W. S. Bruce, on the South Orkneys, was taken over by the Argentine Government in 1904, and has been maintained since that date as a part of the Argentine Meteorological Service. The personnel of this lonely outpost is relieved once each year, in January or February, when supplies are left for the remaining twelve months. The men are then completely isolated, without mail or cable communication, until the relief vessel returns the following year. It is under these conditions that the observations have been carried on for over eleven years. Volume 16 of the *Annals of the Argentine Meteorological Service* contained the data for 1904. Volume 17 (1912-1913), in two parts, contains the continuation of the observations to the end of 1909. The first part includes the hourly meteorological observations in their yearly sequence; the second, the compilation and discussion of the results from the commencement of the series (March, 1903), and the magnetic observations. The record is a remarkably complete one and, printed in *extenso*, fills two good-sized volumes, numbering over a thousand pages and weighing over eleven pounds. It is a fine record of important scientific work, carried on under conditions of loneliness and hardship. Death has come, more than once, to the little party of observers at their distant post of duty.

The climate of the South Orkneys has many features of interest. The presence or absence of pack ice in the surrounding oceans causes great variations in the monthly, seasonal, and annual temperatures. In some years the climatic features are those that pertain to a continental situation, and in others marine conditions prevail. The islands are situated in the direct track of an Antarctic current, and this, even when no ice is present, brings a constant supply of ice-cold water past the group. The mean annual temperature is 24° Fahr.; the coldest month is July, with 106°; the warmest is February, with about 33°. Hence the mean annual range is about 22.5°. The absolute minimum is — 40.2°. The absolute maximum is 47.8°. Apart from foehn influences, the temperature even in summer seldom rises more than 5° to 8° above freezing. A change of wind from an equatorial to a polar quarter, or vice versa, is accompanied by a large change of temperature. The southerly winds, blowing from the continental ice sheet, are the coldest. "Frozen fogs" and snowdrifts make it very difficult to keep the wet-bulb thermometers in condition. A minimum relative humidity of 35 per cent was recorded during a foehn. The maximum hours of sunshine recorded in any month was 120. There are, on the average, 188 sunless days in the year. The mean annual cloudiness is 8.5, the South Orkneys being thus situated in one of the most cloudy regions in the world. For the year the prevailing direction of the cloud motions is west (30 per cent); followed by southwest (27 per cent). The mean hourly velocity of the wind is 13 miles. One storm lasted 37 hours, with a mean wind velocity of nearly 45 miles an hour, and a maximum velocity of 69 miles. Snow falls on the average on 254 days in the year; rain on 113; hail on 27. The mean annual precipitation is 17.60 inches. The maximum depth of snow (end of November usually) is 25.75 inches. The maximum depth recorded was 40 inches. Dew is rarely experienced, since in the calm, clear weather required for its formation, the temperature, even in summer, nearly always falls below freezing, so that hoar frost is deposited. The very rare thunderstorms are nocturnal.

R. DEC. WARD.

PHYSICAL GEOGRAPHY

Radioactivity and the Solution of Problems of Geological Time. Radioactivity affords science a new medium for the measurement of the age of the earth. The discovery of the constant emission of heat by radioactive minerals has necessitated a revision of the physicist's determination of the age of the earth based on the rate of cooling. Uranium and thorium in the rocks of the earth's crust must be considered as the supply according to Arthur Holmes (Radioactivity and the Measurement of

Geological Time, *Proc. Geologists' Assoc.*, Vol. 26, 1915, Pt. 5) of at least three-quarters of the total terrestrial heat. Retaining Kelvin's assumption of an initially molten surface, in no wise negated by the principles of radioactivity, the age of the earth must then be increased to not less than 1,600 million years. The other phenomenon of importance in this connection is the evolution of stable products, helium and lead, by the disintegration of the unstable uranium and thorium. Radioactive minerals contain derivative helium and lead in amounts proportional to their age. The rates of chemical transformation have been established; hence, if the amount of the derived element be determined, the age of the containing mineral is known, assuming that it was free from original helium or lead at the time of genesis and that none of the derived product has been subsequently lost. In the case of helium the latter condition is never fulfilled: the element is slowly lost by dissipation; consequently the determination of helium will only give minimum age. More satisfactory results are obtained from the determination of lead. Provided that the radioactive mineral is free from original lead and from alteration products of contact generation the proportion of lead to uranium will be a constant whose value is determined by its age; the older the mineral the larger the lead ratio. For the establishment of geological age where the ordinary data are scant or lacking, as in the case of the pre-Cambrians and of many igneous intrusives, this radioactive method should prove of great value.

GEOGRAPHICAL NEWS

Present Plans of the U. S. Geological Survey for Field Work in Alaska. In accordance with plans approved by Secretary of the Interior Lane, the investigation of the mineral resources of Alaska by the U. S. Geological Survey will be continued this year by twelve parties. Congress has recognized the necessity of preparing in advance for the survey of this difficult field by including the appropriation for its continuation in the Urgent Deficiency Act, which was approved on February 28. This prompt action makes it possible to plan the work in advance of the opening of the field season and to carry out the plans efficiently and economically.

The work to be done this year includes a detailed survey of the region tributary to Juneau, which is the most important quartz camp in Alaska. A continuation of the study of the mineral resources of the Ketchikan district, where there are important gold and copper mines, is also planned. The investigation of the water powers of southeastern Alaska will also be continued. Only one party will be employed in the Copper River region. Two parties will work in Prince William Sound.

Four parties will make surveys in the region directly or indirectly tributary to the government railroad under construction (cf. *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, p. 924). One of them will study the new Tolovana placer district and also make some supplementary investigation of the Fairbanks lode district. The geologist of this party will later visit the Nome district. A detailed geologic survey will be made of the western part of the Nenana coal field, which is adjacent to the route of the government railroad. Two other parties will be employed in carrying reconnaissance surveys westward from the railroad route to the Kantishna placer and lode district. It is also proposed to make surveys of the lower Yukon, including the Marshall placer district (*U. S. Geol. Surv. Press Bull. No. 233*).

Addition of Geography to the Curriculum of the University of Michigan. With the opening of the academic year 1915-16, geography has been formally added to the work in geology at the University of Michigan, the name of the department being changed to Department of Geology and Geography. Geography has also been made one of the subjects open to election by freshmen in the College of Literature, Science, and the Arts and continues through the year four times weekly, the work of the first semester being devoted to physiography and that of the second semester to anthropogeography. The work in physiography is conducted as heretofore by Assistant Professor Irving D. Scott, and Carl Ortwin Sauer, Ph.D. (University of Chicago), has been appointed instructor in geography. About 150 students have been enrolled in the freshman course, and a course in commercial geography given during the present semester has been elected by 115 students, showing plainly the need for such training at the university.

During the coming summer session of the university there will be included geography work in charge of Doctor Sauer, and in the next academic year, in addition to freshman work and the course in commercial geography, courses in the Geography of North America and Geographic Influences in American History will be offered.

During the present academic year a series of illustrated lectures by non-resident lecturers is being delivered to popular audiences in the new auditorium of the Natural

Science Building. The following have already been given: Miss Dora Keen, Philadelphia, "The First Ascent of Mount Blackburn," November 11, 1915; Dr. Ellsworth Huntington, Milton, Mass., "Weather, Work, and Human Activity," December 2, "The Ideal Climate and the Distribution of Civilization," December 3, "The Past Distribution and the Cause of Climatic Changes," December 3; Professor R. H. Whitbeck, University of Wisconsin, "Some Geographical Influences upon the Trend of Civilization," February 24, 1916, "The Reclamation of Desert Lands," February 25; Professor Walter S. Tower, University of Chicago, "Northern Chile and the Nitrate Industry," March 10, "A Journey Through Argentina," March 10; Miss Ellen Churchill Semple, Louisville, Ky., "The Barrier Boundaries of the Mediterranean in the Present War," March 31, "Geographic Influences in Japan," March 31. The topics of the lectures still to be given are: Professor J. Russell Smith, University of Pennsylvania, "Tree Crops and Conservation," April 21, "The Desert and the Desert's Edge," April 21; Dr. Edward L. Stevenson, Secretary, The Hispanic Society, New York City, "The Expansion of Geographic Knowledge in the Middle Ages and Its Record as Given by the Map-Makers," May 4; "Early Discovery and Exploration in the New World as Represented by Contemporaneous Map-Makers," May 5.

Centennial Exercises of the U. S. Coast and Geodetic Survey. The hundredth anniversary of the founding of the U. S. Coast and Geodetic Survey was celebrated in Washington with appropriate ceremonies on April 5 and 6. In addition to the varied program of addresses listed below, there was an exhibit at the New National Museum illustrating the work of the Survey. Surveying instruments and appliances, pictures of surveying operations and equipment, and charts and the publications of the Survey were shown. As far as possible the earliest instruments and appliances were exhibited beside those now in use, and the earliest available maps and charts of the United States were shown in comparison with the present charts issued by the Survey. The exercises terminated with a banquet at the New Willard Hotel on April 6 at which the President of the United States, the Minister of Switzerland, the Secretary of the Navy, the Secretary of Commerce, and Dr. T. C. Mendenhall were the speakers.

The papers read at the scientific sessions included a number by the heads of various interested government bureaus on the work of their respective organizations and its relation to the work of the Survey. The following heads of bureaus spoke: Dr. George Otis Smith, Director of the U. S. Geological Survey; Brigadier General W. M. Black, Chief of Corps of Engineers, U. S. Army; Hon. George R. Putnam, U. S. Commissioner of Lighthouses; Dr. Hugh M. Smith, U. S. Commissioner of Fisheries; Dr. S. W. Stratton, Director of the U. S. Bureau of Standards.

The remaining speakers and their subjects were: Dr. Douglas Wilson Johnson, Associate Professor of Geology, Columbia University, "The Contribution of the U. S. Coast and Geodetic Survey to Physical Geography"; Rear Admiral J. E. Pillsbury (Retired), U. S. Navy, "Ocean Currents and Deep Sea Explorations of the U. S. Coast and Geodetic Survey"; Dr. Charles Lane Poor, Professor of Celestial Mechanics, Columbia University, "Oceanic Tides, With Special Reference to the Work of the U. S. Coast and Geodetic Survey"; Mr. George Washington Littlehales, Hydrographic Engineer, U. S. Hydrographic Office, "Hydrography and Charts, With Special Reference to the Work of the U. S. Coast and Geodetic Survey"; Dr. Louis A. Bauer, Director of the Department of Terrestrial Magnetism, Carnegie Institution of Washington, "The Work Done by the U. S. Coast and Geodetic Survey in the Field of Terrestrial Magnetism"; Prof. William Henry Burger, Professor of Civil Engineering, Northwestern University, "The Contribution of the U. S. Coast and Geodetic Survey to Geodesy"; Hon. J. Hampton Moore, Member of the U. S. House of Representatives, "The U. S. Coast and Geodetic Survey's Part in the Development of Commerce"; Rear Admiral Richard Wainwright (Retired), U. S. Navy, "The Civil War Record of the U. S. Coast and Geodetic Survey, and What the Survey Is Doing Towards Preparedness"; Dr. Otto Hilgard Tittmann, President of the National Geographic Society, "The International Work of the U. S. Coast and Geodetic Survey."

The Coming Session of the National Conservation Congress. This year's session of the National Conservation Congress will be held in Washington, D. C., May 2-4. The subject for discussion is "The Conservation of National Strength and Efficiency." Among the leading topics for consideration are: "Know America," "Americanization," "Mobilization of Resources," and "Educational Preparedness." About five hundred persons are at work in the various committees of the congress drafting reports which will be presented for consideration. These committees cover such subjects as mineral fuels, iron, soils, water power, nitrate and phosphate preparedness, forests, wild life, cotton, wool, sugar, cattle, irrigation, manufactures, trans-

portation, human resources. The officers are as follows: President, E. Lee Worsham, Atlanta, Ga.; Vice-Presidents, Dr. Henry S. Drinker, South Bethlehem, Pa., and Mrs. Percy V. Pennybacker, Austin, Tex.; Treasurer, Norman C. McLoud, Cleveland, Ohio; Chairman, Executive Committee, Dr. G. E. Condra, Lincoln, Nebr.; Executive Secretary, Thomas R. Shipp, Washington, D. C.

PERSONAL

MR. ROY C. ANDREWS, assistant curator of mammalogy at the American Museum of Natural History, left on March 17 for a zoölogical expedition to China under the auspices of the Museum. The field of study will be the province of Kwei-chau, which will be reached via the Sikiang River.

DR. L. A. BAUER, director of the Department of Terrestrial Magnetism of the Carnegie Institution, gave an illustrated lecture on February 26 before the Brooklyn Institute of Arts and Sciences on "The Earth, A Great Magnet." The subject-matter was essentially the same as that of Doctor Bauer's address at the first joint meeting of the American Geographical Society and the Association of American Geographers, which was printed in the July, 1914, *Bulletin* (Vol. 47, pp. 481-499) of our Society.

PROF. CHARLES P. BERKEY, of the Department of Geology at Columbia University, has been granted a leave of absence for the winter session of the academic year 1916-17.

DR. FAY COOPER COLE, assistant curator of anthropology in the Field Museum of Natural History, Chicago, spoke on March 28 before the Brooklyn Institute of Arts and Sciences on "Wild Tribes of the Philippines."

MR. J. S. DILLER, of the U. S. Geological Survey, on March 13 addressed the Physiographer's Club at Columbia University on "Lassen Peak, Our Most Active Volcano."

MR. S. V. GIBSON, district commercial manager of the New York Telephone Company, gave an illustrated lecture on February 28 before the Brooklyn Institute of Arts and Sciences on "The History of Communication."

DR. M. A. HOWE, curator of the museums of the New York Botanical Garden, spoke on March 14 before the Torrey Botanical Club on "Reef-Building and Land-Forming Algae."

PROF. HAROLD JACOBY, of the Department of Astronomy of Columbia University, gave a lecture on March 6 before the Columbia University Institute of Arts and Sciences on "The Earth's Rotation" at which the Foucault experiment was repeated. He also lectured on February 24 before the Brooklyn Institute of Arts and Sciences on "Navigation, or How Ships Find Their Way Across the Ocean."

PROF. DOUGLAS W. JOHNSON, of Columbia University, repeated his lecture on "The Surface Features of Europe as a Factor in the War," on March 2 before the Washington Academy of Sciences. He has been giving a popular course of three lectures on the "Interpretation of Scenery," both before the Brooklyn Institute of Arts and Sciences and the Columbia University Institute of Arts and Sciences. The subjects of the individual lectures, which were given mainly in March, were "Plains and Plateaus," "Mountains," and "Volcanoes."

PROF. A. L. KROEBER, of the University of California, spoke on February 28 in New York before the American Ethnological Society on "The Zuni Clan."

DR. WILLIS T. LEE, of the U. S. Geological Survey, read a paper on March 20 before the New York Academy of Sciences on "Application of Physiographical Methods to the Correlation of Non-Marine Formations in the Rocky Mountains."

PROF. C. T. MACFARLANE, professor of geography in Teachers College, Columbia University, has been granted leave of absence for the winter or spring session of the academic year 1916-17.

BARON ERLAND NORDENSKIÖLD, the Swedish anthropologist, spoke before the Berlin Anthropological Society on April 17, 1915, on the results of his latest expedition in the boundary districts of Bolivia and Brazil.

DR. IDA HELEN OGILVIE, of the Department of Geology of Barnard College, has been promoted from assistant to associate professor.

DR. K. T. PREUSS, of the Berlin Museum of Ethnography, was engaged, according to last reports, in an ethnographical expedition to the Arhuaco Indians of the Sierra

Nevada de Santa Marta in Colombia, a tribe related to the ancient Chibchas, whose language and customs they have in part retained.

KNUD RASMUSSEN, the Danish explorer, has completed plans for a new expedition to northern Greenland on which he will start early in the spring, according to press despatches. He will explore the region where Peary Land—a peninsula and not an island, as Mylius Erichsen's expedition proved—joins the mainland, especially Independence Fiord, on the east, and Nordenskiöld Inlet and Sherard Osborn Fiord on the west. He will be accompanied by Peter Freuchen as cartographer and Lange Kock as geologist.

DR. EMILIA SNETHLAGE, of the Museu Goeldi of Para, Brazil, has returned from another expedition to the region between the middle reaches of the Xingú and Tapajoz, which she explored in 1909 (cf. references in *Bull. Amer. Geogr. Soc.*, Vol. 44, 1912, pp. 717 and 870, and Vol. 46, 1914, p. 228). She again ascended the Iriri, an important left affluent of the Xingú, and the Curuá, the main tributary of the Iriri. On the Curuá she reached 9° S. latitude, two and a third degrees farther upstream than on her 1909 expedition. Doctor Snethlage brought back important ethnographic collections from the Indians living along these watercourses, the Chipayas and the Curuahés. On the upper Curuá Doctor Snethlage lost a finger through the bite of a *piranha*, the "man-eating" fish described so graphically in Colonel Roosevelt's account of his Brazilian trip.

MR. R. R. STEWART spoke on February 22 before the Torrey Botanical Club on "The Agriculture of the Punjab, India."

ARCHDEACON HUDSON STUCK gave an illustrated lecture on March 10 before the Geographic Society of Chicago on "The Ascent of Mt. McKinley." Archdeacon Stuck, it will be remembered, made the first complete ascent of this, the highest known peak in North America (see *Bull. Amer. Geogr. Soc.*, Vol. 46, 1914, p. 204).

OBITUARY

DR. C. WILLARD HAYES, whose untimely death occurred on February 9 at his home in Washington, D. C., was one of the early workers who contributed most significantly to the organization and development of the modern science of physiography in this country. A graduate of Oberlin and of Johns Hopkins University, and with wide field experience in Alaska and Nicaragua as well as in the United States, he had an unusual background against which to project and test out the theories of physiography. Doctor Hayes's contributions to geology and economic geology were very many, through his lifelong association with the U. S. Geological Survey as geologist and later as chief geologist.

In all his significant papers his interest in physiography is clearly shown, for its problems were ever present in his mind. His most constructive contributions, because of their strength, foresight, and opportuneness, were his paper on the "Geomorphology of the Southern Appalachians," written in association with Marius R. Campbell (*Natl. Geogr. Mag.*, 1894-95, pp. 63-126; summarized by Hayes alone in "The Southern Appalachians," National Geogr. Monographs, pp. 305-336, Amer. Book Co., New York, 1896), and his "Physiography of the Chattanooga District" (*19th Annual Rept., U. S. Geol. Survey, 1897-98*, Pt. II, pp. 1-58). It was a fortunate thing for the science that Dr. Hayes's life for many years was given to the study of the Southern Appalachians, so rich in physiographic problems. His work was constructive and lasting, and his reputation as one of the makers of physiography will be permanent.

RICHARD ELWOOD DODGE.

SIR ARTHUR RÜCKER died on November 1, 1915. His magnetic surveys of the British Isles, in conjunction with Sir Edward Thorpe, for the epochs 1886 (published in 1890) and 1891 (published in 1896) are of geographical interest.